NOMINATING PARTY: The United States of America

FILE NAME: USA CUN15 SOIL STRAWBERRY FRUIT Open Field

BRIEF DESCRIPTIVE TITLE OF NOMINATION:
Methyl Bromide Critical Use Nomination for Preplant Soil Use for Strawberry Fruit Grown in Open Fields (Submitted in 2013 for the 2015 Use Season)

CROP NAME (OPEN FIELD OR PROTECTED): Strawberry Fruit Open Field

QUANTITY OF METHYL BROMIDE NOMINATED:

TABLE 1: QUANTITY OF METHYL NOMINATED

Year	NOMINATION AMOUNT
2015	373,660 kg

NOMINATING PARTY CONTACT DETAILS:

Contact Person:	Federico San Martini, Ph.D.
Title:	Foreign Affairs Officer
Address:	Office of Environmental Policy U.S. Department of State 2201 C Street, N.W. Room 2657 Washington, D.C. 20520 U.S.A.
Telephone:	(202) 647-3819
Fax:	(202) 647-1052
E-mail:	SanMartiniFM@state.gov

Following the requirements of Decision IX/6 paragraph (a)(1) The United States of America has determined that the specific use detailed in this Critical Use Nomination is critical because the lack of availability of methyl bromide for this use would result in a significant market disruption. ■ Yes ☐ No

______________________ ______________________ ____________

Signature Name Date

Title: ____

(Details on this page are requested under Decision Ex. I/4(7) for posting on the Ozone Secretariat website under Decision Ex. I/4(8).)

This form is to be used by holders of single-year exemptions to reapply for a subsequent year's exemption (for example, a Party holding a single-year exemption for 2005 and/or 2006 seeking further exemptions for 2007). It does not replace the format for requesting a critical-use exemption for the first time.

In assessing nominations submitted in this format, TEAP and MBTOC will also refer to the original nomination on which the Party's first-year exemption was approved, as well as any supplementary information provided by the Party in relation to that original nomination. As this earlier information is retained by MBTOC, a Party need not re-submit that earlier information.

CONTACT OR EXPERT(S) FOR FURTHER TECHNICAL DETAILS:

Contact/Expert Person:	Mark Hartman
Title:	Acting Director
Address:	Biological and Economic Analysis Division Office of Pesticide Programs U.S. Environmental Protection Agency 1200 Pennsylvania Avenue, N.W. Mailcode 7503P Washington, D.C. 20460 U.S.A.
Telephone:	(703) 308-0734
Fax:	(703) 308-7042
E-mail:	Hartman.Mark@epa.gov

LIST OF DOCUMENTS SENT TO THE OZONE SECRETARIAT IN OFFICIAL NOMINATION PACKAGE:

1. PAPER DOCUMENTS: **Title of paper documents and appendices**	**No. of pages**	**Date sent to Ozone Secretariat**
2. ELECTRONIC COPIES OF ALL PAPER DOCUMENTS: ***Title of each electronic file (for naming convention see notes above)**	**No. of kilobytes**	**Date sent to Ozone Secretariat**
USA CUN15 SOIL STRAWBERRY FRUIT		

* Identical to paper documents

METHYL BROMIDE CRITICAL USE RENOMINATION FOR PREPLANT SOIL USE (OPEN FIELD OR PROTECTED ENVIRONMENT)

STRAWBERRY FRUIT

1. SUMMARY OF THE NEED FOR METHYL BROMIDE AS A CRITICAL USE

This critical use exemption (CUE) nomination for methyl bromide (Table 1) is for strawberry production areas where there is a critical need for methyl bromide to treat fields 1) where 1,3-dichloropropene (1,3-D) is limited by township caps, 2) where a transition period is needed for the use of broadcast 100% chloropicrin, or 3) where *Macrophomina* and *Fusarium* have not been acceptably controlled with alternative fumigant methods. The methyl bromide nomination is a smaller amount than nominated in previous years (Table 2). There is an expectation that there will continue to be a reduced critical need for methyl bromide in the near future as advances are made 1) in safely applying 100% chloropicrin, 2) in strategies to improve efficacy in applying 1,3-D, and 3) in transitioning from experimental to commercial use of non-chemical tools, such as steam, anaerobic soil disinfestations, and substrate production.

Failure to successfully manage emerging diseases increases inoculum with each successive season. Disease severity is dependent on several factors, including choice of tolerant or susceptible cultivars, weather, soil conditions, and field location. Where disease pressure from *Macrophomina* and *Fusarium* is high, specialists have estimated 5% yield loss. Where township caps limit the use of 1,3-D, losses could be even higher.

The U.S. Government (USG) has reviewed all factors concerning the transition from the use of methyl bromide. The USG has nominated amounts of methyl bromide based only on those sub-sectors that cannot transition away from methyl bromide.

2. SUMMARIZE WHY KEY ALTERNATIVES ARE NOT FEASIBLE

1,3-D/Chloropicrin Treatments

The University of California Cooperative Extension lab in Salinas has observed that collapsing strawberry plants were associated with at least one, and sometimes both, of the pathogens *Macrophomina* and *Fusarium* (Koike et al., 2011). According to Koike et al. (2011), the pathogens have been most commonly recovered from areas in Santa Barbara County (*Macrophomina*), Ventura County (*Macrophomina* and *Fusarium*) and Orange County (*Macrophomina*) counties (Table 3, below). In 2010 and 2011, *Macrophomina* and *Fusarium* were detected for the first time in the central coast production region of Monterey and Santa Cruz counties. According to Koike et al. (2011), "virtually all of these plant collapse situations involve fields that have switched from methyl bromide + chloropicrin to alternative fumigant products and bed fumigation practices." These disease-prone production fields and those affected by township limitations on 1,3-D are those for which methyl bromide is being nominated.

California extension specialists and growers have observed that fields in several counties with a history of three years of 1,3-D/chloropicrin have become infested with increasing populations of

Macrophomina and *Fusarium* pathogens, which cause increasing damage to crops and risk inoculum build-up in subsequent years (Koike et al., 2011; Ajwa, personal communication, email Nov. 7 2011). With disease pressure in critical areas the yield loss due to diseases after three seasons of 1,3-D/chloropicrin was estimated to be 5% (California Strawberry Commission—CSC—in the 2013 CUE application). In Western Australia, Fang et al. (2011) found that plant decline due to several pathogens ranged from 3% to 40% depending on soil pH, moisture, cultural practices, and cultivar selections. Gordon et al. (2012) found that inadequate distribution of dripped fumigant resulted in significant differences in *Fusarium* populations within the bed. While *Fusarium* propagules were eliminated from the top ~5 cm of soil throughout the bed and to 30 cm directly below the drip tape, high populations persisted at 30 cm and below at the shoulders and center of the bed. Experiments are being planned to assess the efficacy of two or more drip tapes per bed under California conditions. In Florida's typical sandy soils infested with nematodes, fumigation with two drip tapes resulted in reduced yields compared to shank applications to beds of 1,3-D (Noling and Cody 2012a; Noling and Cody 2012b). Fungicides applied through two dedicated drip tapes, provided significantly greater marketable yield and reduced *Macrophomina*-induced charcoal rot, in trials in Florida (Mertely et al., 2012).

The possible difference in efficacy between broadcast versus drip applications of 1,3-D are unclear for California production conditions. In Florida field trials, shank-applied 1,3-D provided at least comparable yields compared to methyl bromide strip fumigation (Noling and Cody, 2012a; Noling and Cody, 2012b). In Florida sandy soils, plant mortality due to *Macrophomina* was comparable for soils treated with methyl bromide, 1,3-D/chloropicrin, metam-potassium, metam-sodium, and DMDS (Noling and Cody, 2012b).

Chloropicrin

A plan was proposed by the CSC to transition from the use of methyl bromide. It is well known that chloropicrin is an effective fungicide. For some areas where permits allow the use of 100% chloropicrin, under certain conditions problem diseases can be effectively managed. A transition period will be necessary to gain technical expertise in the application of 100% chloropicrin. There have been some recent instances of bystander exposure to chloropicrin where this use has been tried.

Metam-sodium

A report of a small-scale experiment conducted in Israel (Zveibil et al., 2012) indicated that metam-sodium may be an effective alternative to methyl bromide for managing *Macrophomina phaseolina*, which causes crown and root rot in strawberries. The experiment has not been repeated and has not been tested on demonstration-size scale. Soil was exposed to bagged inoculum of *M. phaseolina*, both sclerotia and infected plant tissue, which were buried in small test plots and subjected to methyl bromide, metam-sodium, or drip-applied 1,3-D/chloropicrin. Mortality of the pathogen was greatest, and comparable, for treatments with methyl bromide and metam-sodium. Treatments of 1,3-D/chloropicrin were less effective than those of methyl bromide and metam-sodium, especially for inoculum buried 30 cm below ground versus 10 cm.

Steam Treatment

Steam is an effective non-chemical soil treatment and has potential to replace methyl bromide for sensitive areas, such as fumigant buffer zones (Fennimore et al., 2012b; Samtani et al., 2012). Current research is examining ways to maximize applicator efficiency and attempt to find ways to reduce costs (Fennimore et al., 2012a; Samtani et al., 2012; Fennimore et al., 2012b; Fennimore et al., 2011b; Fennimore et al., 2011d). Blending soil with steam improves heat distribution in the soil and combining steam with exothermic compounds (such as CaO or KOH) or biofumigants (such as mustard seed meal) can improve soil disinfestations (Fennimore et al., 2012a). Steam treatments provided consistent control of a variety of weeds with efficacy comparable to methyl bromide treatments (Samtani et al., 2011).

Currently steam treatment of soil may be too slow a process for application to entire production fields, with a rate of less than a hectare per day, and would require additional labor and fuel costs. Daugovish et al. (2011c) found that a combination of solarization and steam provided beneficial effects, although not complete disease control, on plants in buffer zones infested with *Fusarium* and *Macrophomina*. Technologies adapted to strawberry production are being examined and researched. Fennimore et al. (2012a) have examined the commercial steam sterilizer from Italy—the Ferrari Sterilter used in basil production—and its potential for strawberry production in California. The Sterilter treats flat soil with a 185 x 250 cm grid containing 99 spikes, each to inject steam into soil approximately 25 cm deep. However, as designed, the Sterilter is not compatible with strawberry production requirements, since it works on flat ground and when beds are made the soil is brought up from deeper than the treated 25 cm. The researchers believe that the machine can provide a model from which a sterilizer can be designed for California strawberry production. It is unclear what the timeframe is for the development and testing of effective steam equipment.

Anaerobic Soil Disinfestation (ASD) Treatments

ASD is being investigated for strawberry production in Florida (e.g., Rosskopff et al., 2012; Butler et al., 2012) and California (e.g., Shennan et al., 2012; Shennan et al., 2011; Daugovish et al., 2011b). These experimental trials have shown good disease suppression and fruit yields comparable to methyl bromide treatments and other chemical fumigants. Results of some studies have indicated that rice bran, incorporated in loam to clay loam soils, is an effective organic source that has shown good results in coastal California production (Shennan et al., 2012). However, state regulations for nitrates into groundwater and nitrous oxide into the air will be considerations for full commercialization of ASD. Some costs may be higher for ASD due to possible lower yields than the methyl bromide standard (Klonsky et al., 2011) and a detailed economic analysis of ASD systems is in progress (Shennan et al., 2012). For areas such as southern California, solarization techniques may be combined with ASD for improved pest control (Shennan et al., 2012; Butler et al., 2012). USDA and CSC are funding studies on ASD (e.g., Shennan et al., 2012; Butler et al., 2011; Louws et al., 2011).

Of interest and requiring further study is 1) whether ASD will acceptably manage *Macrophomina* and *Fusarium*—positive results against *Macrophomina* were noted by Rosskopf et al. (2012), but further study is required, 2) whether it can be used on full-field production acreage, 3) whether it is an economically feasible treatment considering the requirement for a large organic amendment component (e.g., Butler et al., 2012), 4) the need to optimize anaerobic conditions by selecting the carbon source, managing nitrogen, managing moisture, treatment timing, type of tarp, and duration of tarping (Shennan et al., 2012; Rosskopf et al., 2012), and 5) to investigate the observation in ASD experiments in Florida and Tennessee that pathogen and weed control have not necessarily correlated with increased anaerobic conditions (Rosskopf et al., 2012; Butler et al., 2012).

Resistant Cultivars

Breeding for disease-resistance will be an important component of all future disease management strategies. Some breeding lines show differential tolerance to *Macrophomina* or *Fusarium* (Daugovish et al., 2011a). Recent evaluations show that most of the genotypes considered for commercial cultivar development have at least moderate resistance to Verticillium wilt (Gordon et al., 2012). A successful breeding program may require the development of multi-gene resistance to two or three important pathogens. Desirable varietal characteristics for fruit quality will need to be developed in addition to disease resistance.

Substrate System

Studies examining the use of non-soil substrates in beds (sometimes called raise-bed trough—RaBeT system) may be a feasible production technology and is being studied as part of the Farming Without Fumigants program (Wang et al., 2012; Fennimore et al., 2011a; Fennimore et al., 2011c). Results of recent research (Wang et al, 2012; Thomas et al., 2011) indicate advantages that might include 1) starting with disease-free growing media, 2) efficient management of water, nutrients, and runoff, and 3) yields competitive with grower standards. Currently, however, numerous technological and cost aspects must be considered, including: 1) the process is labor intensive, 2) there is a complex fertilizer/irrigation regime that must be optimized (see Fennimore, 2011a) 3) there are high costs and issues of availability and effectiveness of substrates and fabrics, 4) growers must adopt a different 4-row bed system (instead of a 2-row system), and 5) adjustments must be made to fertilizer injectors and other equipment. Research is continuing to try to reduce costs and scale-up for commercial use.

3. IS THE USE COVERED BY A CERTIFICATION STANDARD?

There is no certification standard for strawberry fruit production.

4. PROPORTION OF CROP USING METHYL BROMIDE

TABLE 2. PROPORTION OF TOTAL HECTARES WHERE METHYL BROMIDE IS A CRITICAL NEED

REGION WHERE METHYL BROMIDE USE IS REQUESTED	TOTAL CROP AREA[1] (HA)	AREA NOMINATED FOR METHYL BROMIDE USE IN 2015 (HA)	PROPORTION OF TOTAL CROP AREA TO BE TREATED WITH CUE METHYL BROMIDE (%)
California	**15,240**	**2,198**	**13.5**

[1] California Strawberry Commission 2013 Survey showed a total production of 40,192 acres (16,265 ha), less organic production acres (2532 acres; 1,025 ha) (http://www.calstrawberry.com/commission/asurvey.asp)

5. IF PART OF THE CROP AREA IS TREATED WITH METHYL BROMIDE, INDICATE THE REASON WHY METHYL BROMIDE IS NOT USED IN THE OTHER AREA, AND IDENTIFY WHAT ALTERNATIVE STRATEGIES ARE USED TO CONTROL THE TARGET PATHOGENS AND WEEDS WITHOUT METHYL BROMIDE THERE.

Methyl bromide is *not* used on the majority of strawberry production fields (Table 2). Alternatives are effective and currently used 1) on soils where alternatives have been effective and/or where soils have below-threshold pathogen populations so that disease impact on fruit production is low, 2) on soils where township caps do not restrict 1,3-D use, and 3) on soils where broadcast 100% chloropicrin has been effective and where there were no unexpected emissions.

Regulations in California

The regulations in California that impact strawberry growers have recently changed. Currently all of the county agricultural commissions where strawberry fruit is grown now have a process in place to allow the use of chloropicrin at rates of up to 392 kg/ha (350 lb/acre). The specific location, topography, and proximity to sensitive sites will impact the granting of a permit. The use of up to 392 kg per ha of chloropicrin can provide enhanced efficacy where plant pathogens are difficult to control. The California Department of Pesticide Regulation (Cal DPR) is currently reviewing the registration of chloropicrin and 1,3-D and should announce its recommendations in early 2013. Based on the Cal DPR review the use of conditions for chloropicrin and 1,3-D (e.g. buffers, reentry intervals, tarps, use rate, etc.) could change before 2015. In addition, the 1,3-D review could lead to changes in how the 1,3-D township caps are calculated.

6. WOULD IT BE FEASIBLE TO EXPAND THE USE OF THESE METHODS TO COVER AT LEAST PART OF THE CROP THAT HAS REQUESTED USE OF METHYL BROMIDE? WHAT CHANGES WOULD BE NECESSARY TO ENABLE THIS?

Persistent disease problems affect a portion of production land (Table 3). Expanding alternative treatments will occur with the optimization of 1,3-D/chloropicrin applications as well as the ultimate adoption of non-chemical methods such as ASD, steam, and substrate systems, should these methods become feasible. However, as described in Section 5, above, new considerations by Cal DPR with regard to chloropicrin and 1,3-D may result in a modification of expected transition to some alternatives.

Expanding the use of current alternatives may require further experience and experimentation with individual application methods. For example, with dripped 1,3-D/chloropicrin, Gordon et al. (2012) found that inadequate and unequal distribution of the dripped fumigant resulted in significant differences in *Fusarium* populations within the bed. Experiments are being conducted to assess the efficacy of two or more drip tapes per bed to increase efficacy. Other examples were cited in Section 2, above, in descriptions of the requirements for commercializing ASD and substrate production systems.

TABLE 3. CALIFORNIA STRAWBERRY COMMISSION ESTIMATE OF PRODUCTION LAND THAT IS AFFECTED BY DISEASES IN STRAWBERRY PRODUCTION AREAS.

Pest	**Production area affected by disease (%)**		
	Southern Region*	Summer Planting Region**	Northern Region***
Macrophomina	6	10	5
Fusarium	4	5	3
Verticillium	2	3	10

*Production areas in or near: Ventura, Orange, San Diego, Riverside
** Production areas in or near: parts of Santa Maria (Santa Barbara), Ventura
*** Production areas in or near: parts of Santa Maria (Santa Barbara), Watsonville, Salinas

7. ECONOMIC FEASIBILITY OF ALTERNATIVES

Net revenue is calculated here as gross revenue minus operating costs. This calculation is known as a partial budget analysis and is a good measure to describe the direct losses of income that may be suffered by the users. The net revenue presented here does not represent net income to the users. Net income, which is an indication of the profitability of an operation of an enterprise, is gross revenue minus the sum of operating and fixed costs. Net income should be smaller than the net revenue measured in this study. Fixed costs were not included because they are often difficult to determine and verify.

Summary of Economic Feasibility

The critical need for methyl bromide is for strawberry production land 1) where 1,3-D use is limited by township caps, 2) where a transition period is needed for the use of broadcast 100% chloropicrin, or 3) where *Macrophomina* and *Fusarium* have not been successfully controlled after several seasons of using alternatives. The economic analysis of strawberry fruit production compared data on yields, crop prices, revenues and costs using methyl bromide and using alternative pest control regimens in order to estimate the loss of methyl bromide availability. Where California regulations permit, the primary alternatives are 1,3-D/chloropicrin (225/123 lb/acre; 252/138 kg/ha) (e.g., Pic-Clor 60, 33 gal/acre; 310 l/ha) or chloropicrin at 300-350 lb per acre (336-392 kg/ha).

The economic analyses (see Table 4) indicate fumigant-treated soils can result in gains or losses to net revenues that range from -37% (with drip Pic-Clor 60) to 9% (with 100% broadcast chloropicrin), based on the cost of the individual fumigant and estimated yield loss. For the 2012-13 growing season, chloropicrin has been approved for use in all production areas at a maximum rate of 350 lb per acre (392 kg per ha), although county permits are subject to change. Technical and regulatory issues reduce the feasibility of 1,3-D use for a portion of strawberry production fields in California. As described in Sections 2 and 6, above, while drip-application is economically desirable, effectiveness against major pathogens has been unacceptable in some areas. Research is being conducted to evaluate disease control with 1,3-D with optimized application methods, rates, formulations, and tarps.

The economic factors that support the critical need for methyl bromide affect areas 1) where regulations restrict the use of alternatives, 2) where increased production costs are incurred for alternatives, 3) where there are additional pest control requirements due to lower efficacy of alternatives, and/or 4) where there are resulting shifts in other production or harvesting practices and yield losses. The feasibility of alternatives as compared to methyl bromide is dependent on maintaining yield and fruit quality at a competitive cost.

It has been pointed out (Mayfield and Norman, 2012) that overall U.S. strawberry production has increased each year since 2004, including California production. The increase, at least in part, is due to the success of pest management and breeding programs that are a result of extensive research efforts to identify methyl bromide alternatives. The annual overall reduction in the methyl bromide nomination for California strawberries since 2004, suggests that the strategy of progressive reduction in methyl bromide allocation has been successful, thus far, in enabling growers to reduce the aggregate use of methyl bromide in conjunction with other pest management methods for most strawberry production. The success of the methyl bromide phase-out for strawberry production rests on developing cost effective alternatives that do not require periodic treatment with methyl bromide.

Measures Used to Quantify the Impacts of a Loss of Methyl Bromide
Crop budgets were analyzed for pre-plant sectors to determine the likely economic impact if methyl bromide were unavailable. Various measures were used to quantify the impacts, including the following:

(1) **Loss per Hectare.** For crops, this measure is based on yield impact and closely tied to income. It is relatively easy to measure, but may be difficult to interpret in isolation.

(2) **Loss/Gain per Kilogram of Methyl Bromide**. This measure indicates the value of methyl bromide to crop production and is calculated by multiplying the loss/gain of methyl bromide by the number of fumigation cycles (i.e., one) and then dividing the quantity by the number of kilograms of methyl bromide used to treat a hectare.

(3) **Loss as a Percentage of Gross Revenue.** This measure has the advantage that gross revenues are usually easy to measure, at least over some unit, *e.g.*, a hectare of land or a storage operation. However, high-value commodities or crops may provide high revenues, but may also entail high costs. Losses of even a small percentage of gross revenues could have important impacts on the profitability of the activity.

(4) **Loss as a Percentage of Net Operating Revenue**. Net cash revenues are defined as gross revenues minus operating costs. This is a very good indicator of the direct losses of income that may be suffered by the owners or operators of an enterprise. However, operating costs can often be difficult to measure and verify.

(5) **Operating Profit Margin**. Operating profit margin is defined as net operating revenue divided by gross revenue per hectare. This measure would provide the best indication of the total impact of the loss of methyl bromide to an enterprise. Again, operating costs may be difficult to measure and fixed costs even more difficult. However, fixed costs are considered to be identical for all alternative scenarios, therefore, fixed costs were not included in the analysis.

These measures represent different ways to assess the economic feasibility of methyl bromide alternatives for strawberry fresh fruit producers. Because producers (suppliers) represent an integral part of any definition of a market, the threshold of significant market disruption is met if there is a significant impact on commodity suppliers using methyl bromide. These economic measures provide the basis for making that determination.

The analysis presented in Table 4, below, compares the costs of three different fumigation options and a steam treatment to the cost of treating with methyl bromide. Table 4 compares the impacts between the baseline methyl bromide and the alternatives of steam, broadcast chloropicrin at 300 pounds per acre, broadcast 1,3-D plus chloropicrin (Pic-Clor 60), and drip-applied 1,3-D plus chloropicrin (Pic-Clor 60). Costs consist of all production costs including labor, equipment, application, and material. Yield losses may be 5% for soils treated with drip-applied 1,3-D, based on field observations, due to the increased prevalence of disease. Where township caps limit the use of 1,3-D, losses could be as high as 13%, according to CSC.

Steam is a promising potential alternative. The analysis presented below (Table 4) is based on small plot production (4 ha or less) and, therefore, may not be an accurate scenario for larger commercial-scale production. In addition, steam equipment for commercial use is in the development stage—for example, adapting the Italian Sterilter to California conditions (see Section 2, above). The cost of fuel is the primary driver for the cost of steam. Current diesel prices in California average around $4.50 per gallon as quoted by Pricelock.com on October 12, 2012 (www.pricelock.com/index).

TABLE 4. ECONOMIC IMPACTS OF METHYL BROMIDE + CHLOROPICRIN, STEAM, CHLOROPICRIN AND BROADCAST AND DRIP-APPLIED 1,3-D + CHLOROPICRIN

CALIFORNIA FRESH STRAWBERRY	METHYL BROMIDE + PIC 50/50	STEAM	CHLOROPICRIN @300 LB/A BROADCAST	PIC-CLOR 60 GPA BROADCAST	PIC-CLOR 60 EC 25 GPA DRIP
PRODUCTION LOSS (%)	0%	0%	0%	0%	5%
PRODUCTION PER HECTARE (KG/HA)	48,164	48,164	48,164	48,164	45,756
**PRICE PER UNIT (US$)	$ 2.91	$ 2.91	$ 2.91	$ 2.91	$ 2.91
= GROSS REVENUE PER HECTARE (US$)	$ 140,162	$ 140,162	$ 140,162	$ 140,162	$ 133,154
- OPERATING COSTS PER HECTARE (US$)**	$ 132,214	$ 131,722	$ 131,526	131,383	$ 128,151
= NET REVENUE PER HECTARE (US$)	$ 7,949	$ 8,440	$ 8,636	$ 8,779	$ 5,003
		*LOSS MEASURES *			
1. LOSS/GAIN PER HECTARE (US$)	$0	$492	$ 688	$ 339	$ (2,946)
2. LOSS/GAIN PER KILOGRAM OF METHYL BROMIDE (US$)	$0	$ 2.89	$ 4.04	$ 1.99	$ (17.32)
3. LOSS/GAIN AS A PERCENTAGE OF GROSS REVENUE (%)	0%	0%	0%	0%	-2%
4. LOSS/GAIN AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0%	6%	9%	4%	-37%
5. OPERATING PROFIT MARGIN (%)	6%	6%	6%	6%	4%

**Note that the measures in the tables above must be interpreted carefully. Operating costs do not include fixed costs and net revenue equals gross revenue minus operating costs. Values may not calculate due to rounding during conversion from $/lb to $/kg.

8. RESULTANT CHANGES TO REQUESTED EXEMPTION QUANTITIES

The USG has applied a transition rate to the alternatives, which is reflected in the nomination amount and detailed in Table 5. The amount requested reflects adjustments for areas with high pest pressure, 1,3-D/chloropicrin (Telone™) township caps, and local regulatory restrictions on the use of chloropicrin.

TABLE 5. NOMINATION AMOUNT:

SECTOR		STRAWBERRY FRUIT California Strawberry Commission
Quantity Requested for 2014:	Amount (kgs)	415,067
Quantity Recommended by MBTOC/TEAP for 2014 :	Amount (kgs)	389,640
Quantity Authorized by Parties for 2014:	Amount (kgs)	415,067
	Area (ha)	2,442
	Rate	170
Transition from 2014 Baseline Adjusted Value	Percentage (%)	10%
Quantity Required for 2015 Nomination:	Amount (kgs)	**373,660**
	Area (ha)	**2,198**
	Rate	**170**

9. CITATIONS

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